

# A2 CC Q1 Test 3 Review Key

ac = -12

$$\textcircled{2x^2 + x - 6}$$

$$2x^2 + 4x - 3x - 6$$

$$2x(x+2) - 3(x+2)$$

$$(2x-3)(x+2)$$

$$1) \frac{x(x-3)}{2x^2+x-6} \cdot \frac{(x+2)(x-2)}{x^2-4} = \boxed{\frac{x}{2x-3}}$$

$$(2x-3)(x+2) \quad (x-3)(x-2)$$

$$2) \frac{(x+3)(x-3)}{x^2-9} \cdot \frac{x(5-x)}{x^2-x-12} \cdot \frac{(x-4)(x-4)}{x^2-8x+16} = \boxed{-1(x-3) \text{ or } -x+3 \text{ or } 3-x}$$

$$x(x-5) \quad (x-4)(x+3)$$

AC Method →

$$3) \frac{(3y+5)(y+2)}{3y^2+11y+10} \cdot \frac{(1+5y)(1-5y)}{1-25y^2} = \boxed{\frac{1-5y}{y-2}}$$

$$(5y+1)(y+2) \quad (3y+5)(y-2)$$

$$4) 3x^2-12$$

$$3(x^2-4) \leftarrow \text{GCF}$$

$$\boxed{3(x+2)(x-2)} \leftarrow \text{DOTS}$$

$$5) 81y^4-16$$

$$(9y^2+4)(9y^2-4) \text{ DOTS}$$

$$\boxed{(9y^2+4)(3y+2)(3y-2)} \text{ DOTS}$$

$$6) x^3-x^2-6x$$

$$x(x^2-x-6) \text{ GCF}$$

$$\boxed{x(x-3)(x+2)} \text{ AM}$$

$$7) 4x^2-6x-4$$

$$2(2x^2-3x-2) \text{ GCF}$$

$$2(2x^2-4x+1x-2)$$

$$\downarrow 2x(x-2)+1(x-2)$$

$$\boxed{2(x-2)(2x+1)}$$

$$\begin{aligned}
 & \text{ac} = -15 \\
 8) & \quad 5a^2 + 14a - 3 \\
 & \quad 5a^2 + 15a - 1a - 3 \\
 & \quad 5a(a+3) - 1(a+3) \\
 & \quad \boxed{(5a-1)(a+3)}
 \end{aligned}$$

$$\begin{aligned}
 9) & \quad a^3 - 2a^2 + a - 2 \\
 & \quad a^2(a-2) + 1(a-2) \\
 & \quad \boxed{(a^2+1)(a-2)}
 \end{aligned}$$

$$\begin{aligned}
 10) & \quad x^2 + ax + bx + ab \\
 & \quad x(x+a) + b(x+a) \\
 & \quad \boxed{(x+b)(x+a)}
 \end{aligned}$$

$$\begin{aligned}
 11) & \quad x\sqrt{3} + \sqrt{75x^2} \\
 & \quad \quad \quad \wedge \\
 & \quad \quad \quad \sqrt{25x^2}\sqrt{3} \\
 & \quad x\sqrt{3} + 5x\sqrt{3} \\
 & \quad \boxed{6x\sqrt{3}}
 \end{aligned}$$

$$\begin{aligned}
 12) & \quad 5\sqrt{-27} - \sqrt{-108} - 3\sqrt{-75} \\
 & \quad 5i\sqrt{27} - i\sqrt{108} - 3i\sqrt{75} \\
 & \quad \quad \quad \wedge \quad \quad \quad \wedge \quad \quad \quad \wedge \\
 & \quad \quad \quad \sqrt{9}\sqrt{3} \quad \sqrt{36}\sqrt{3} \quad \sqrt{25}\sqrt{3} \\
 & \quad 5i \cdot 3\sqrt{3} - i6\sqrt{3} - 3i(5)\sqrt{3} \\
 & \quad 15i\sqrt{3} - 6i\sqrt{3} - 15i\sqrt{3} \\
 & \quad \boxed{-6i\sqrt{3}}
 \end{aligned}$$

$$\begin{aligned}
 13) & \quad \frac{5x^2 - 15x}{27x - 3x^3} = \frac{5x(x-3)}{3x(9-x^2)} \\
 & \quad = \frac{5x \cancel{(x-3)}^{-1}}{3x(\cancel{3-x})(3+x)} = \boxed{\frac{-5}{3(3+x)}}
 \end{aligned}$$

Set  
denominators  
equal to  
zero

$$\begin{aligned}
 14) \ a) & \quad \frac{3-x}{-3} = 0 \\
 & \quad \quad \quad -x = -3 \\
 & \quad \quad \quad x = 3
 \end{aligned}$$

$$\begin{aligned}
 b) & \quad x^2 - 25 = 0 \\
 & \quad (x+5)(x-5) = 0 \\
 & \quad \boxed{x = -5 \quad x = 5}
 \end{aligned}$$

$$\begin{aligned}
 c) & \quad 2x^2 - 3x = 0 \\
 & \quad x(2x-3) = 0 \\
 & \quad \boxed{x=0} \quad | \quad 2x-3=0 \\
 & \quad \quad \quad 2x=3 \\
 & \quad \quad \quad \boxed{x=\frac{3}{2}}
 \end{aligned}$$



(\*) Isolate the radical

$$d) x^3 + x^2 - 2x = 0$$

$$x(x^2 + x - 2) = 0$$

$$x(x+2)(x-1) = 0$$

$$x=0 \quad | \quad x=-2 \quad | \quad x=1$$

$$16) \sqrt{2x+1} - 1 = 4$$

$$(\sqrt{2x+1})^2 = (5)^2$$

$$2x+1 = 25$$

$$\frac{2x}{2} = \frac{24}{2}$$

$$x = 12$$

$$17) (-3i^{50}) + (5i^{51})$$

$$\frac{50}{4} = 12.5$$

$$\frac{51}{4} = 12.75$$

$$i^{50} = -1 \quad i^{51} = -i$$

$$-3(-1) + 5(-i)$$

$$3 - 5i$$

$$19) 2^{x+1} = 16$$

$$2^{x+1} = 2^4$$

$$x+1 = 4$$

$$-1 \quad -1$$

$$x = 3$$

$$20) \left(\frac{1}{3}\right)^{x+1} = 27$$

$$(3^{-1})^{x+1} = 3^3$$

$$3^{-x-1} = 3^3$$

$$-x-1 = 3$$

$$+1 \quad +1$$

$$-x = 4$$

$$x = -4$$

$$15) x - \sqrt{9-2x} = 3$$

$$\frac{-x}{-x}$$

$$-\sqrt{9-2x} = 3-x$$

$$\frac{-1}{-1} \quad \frac{-1}{-1}$$

$$(\sqrt{9-2x})^2 = (-3+x)^2$$

$$9-2x = 9-3x-3x+x^2$$

$$+2x \quad +2x$$

$$9 = 9 - 4x + x^2$$

$$-9 \quad -9$$

$$0 = x^2 - 4x$$

$$x(x-4)$$

$$x=0 \quad | \quad x=4$$

reject  
(doesn't  
check)

$$18) (4y-5i)(2y+i) \quad i^2 = -1$$

$$8y^2 + 4yi - 10yi - 5i^2$$

$$8y^2 - 6yi + 5$$

$$8y^2 - 6yi + 5$$

$$\left(\frac{1}{2} - \frac{x}{2}\right)\left(\frac{1}{2} - \frac{x}{2}\right)$$

$$\frac{1}{4} - \frac{x}{4} - \frac{x}{4} + \frac{x^2}{4}$$

$$\frac{1}{4} - \frac{2x}{4} + \frac{x^2}{4}$$

$$\frac{1}{4} - \frac{1}{2}x + \frac{x^2}{4}$$

$$21) \quad \begin{array}{r} 2x^{\frac{2}{3}} + 4 = 22 \\ -4 \quad -4 \\ \hline \end{array}$$

$$\frac{2x^{\frac{2}{3}}}{2} = \frac{18}{2}$$

$$x^{\frac{2}{3}}\left(\frac{3}{2}\right) = 9^{\frac{2}{2}}$$

$$\boxed{x = 27}$$

$$22) \quad \begin{array}{r} 2\sqrt{2x+3} + x = 1 \\ -x \quad -x \\ \hline \end{array}$$

$$\frac{2\sqrt{2x+3}}{2} = \frac{1-x}{2}$$

$$\left(\sqrt{2x+3}\right)^2 = \left(\frac{1}{2} - \frac{x}{2}\right)^2$$

$$4(2x+3) = \left(\frac{1}{4} - \frac{1}{2}x + \frac{x^2}{4}\right) 4$$

$$\begin{array}{r} 8x+12 = 1 - 2x + x^2 \\ -12 \quad -12 \\ \hline \end{array}$$

$$\begin{array}{r} 8x = -11 - 2x + x^2 \\ -8x \quad -8x \\ \hline \end{array}$$

$$0 = x^2 - 10x - 11$$

$$(x-11)(x+1)$$

$$\begin{array}{l} x=11 \\ \text{reject} \end{array} \quad \boxed{x=-1}$$

$$23) \quad \begin{array}{r} \sqrt{x-1} + x = 7 \\ -x \quad -x \\ \hline \end{array}$$

$$\left(\sqrt{x-1}\right)^2 = (7-x)^2$$

$$\begin{array}{r} x-1 = 49 - 14x + x^2 \\ +1 \quad +1 \\ \hline \end{array}$$

$$\begin{array}{r} x = 50 - 14x + x^2 \\ -x \quad -x \\ \hline \end{array}$$

$$0 = x^2 - 15x + 50$$

$$(x-5)(x-10)$$

$$\boxed{x=5} \quad \begin{array}{l} x=10 \\ \text{reject} \end{array}$$

$$24) \quad (6x^6y^2)^2 \cdot \left(\frac{x^5y^2}{2}\right) = 6^2x^{12}y^4 \left(\frac{x^5y^2}{2}\right) = \frac{36x^{17}y^6}{2} = \boxed{18x^{17}y^6}$$

$$25) \quad (r^2s)^3 (3s)^{-2} (9r)^2 = (r^6s^3) \left(\frac{1}{3^2s^2}\right) \cdot 81r^2 = \frac{81r^8s^3}{9s^2} = \boxed{9r^8s}$$

$$26) \frac{a^4 b^{-2} c}{a^{-5} b^5} = \boxed{\frac{a^9 c}{b^7}}$$

$$27) 4a^{\frac{2}{3}} = \boxed{4 \sqrt[3]{a^2}}$$

$$28) x^{-\frac{3}{4}} = \frac{1}{x^{\frac{3}{4}}} = \boxed{\frac{1}{\sqrt[4]{x^3}}}$$

$$29) (5y)^{\frac{3}{8}} = \boxed{\sqrt[8]{(5y)^3}}$$

cube root  $\rightarrow$

$$30) \sqrt[3]{32x^7y^9z^2}$$

$$\sqrt[3]{8x^6y^9} \sqrt[3]{4xz^2}$$

$$\boxed{2x^2y^3 \sqrt[3]{4xz^2}}$$

$$31) \frac{6\sqrt{8x^3} - 9\sqrt{10x^5}}{3\sqrt{2x}} \cdot \frac{\sqrt{2x}}{\sqrt{2x}} = \frac{6\sqrt{16x^4} - 9\sqrt{20x^6}}{3(2x)}$$

$$\sqrt{20x^6}$$

$$\sqrt{4x^6} \sqrt{5}$$

$$2x^3\sqrt{5}$$

$$= \frac{6 \cdot 4x^2 - 9 \cdot 2x^3\sqrt{5}}{6x} = \frac{24x^2 - 18x^3\sqrt{5}}{6x}$$

$$= \frac{24x^2}{6x} - \frac{18x^3\sqrt{5}}{6x}$$

$$\boxed{4x - 3x^2\sqrt{5}}$$